CSMLS SCSLM

Canadian Society for Medical Laboratory Science
Société canadienne de science de laboratoire médical

The Use of Simulation for Competency Attainment

Pan-Canadian Entry-to-Practice Medical Laboratory Assistant (MLA) Competency Profile

Effective with the February 2027 CSMLS Examination

For the 2024 Revised CSMLS MLA Competency Profile
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Definition of Simulation

For the medical laboratory profession, as derived by participants at the National Simulation and Clinical Placement Educator Forum (2016), simulation is defined as:

> Simulation is an educational technique used to imitate real life scenarios (in part or whole), which enables participants to demonstrate and receive feedback on knowledge, skills, abilities and/or judgment. This can include but is not limited to communication, problem-solving, critical thinking and the ability to collaborate and work effectively within a health care team. Simulation can reflect simple to complex situations or processes and can be accomplished in any of the following examples:
>
> - through interactive written case-based scenarios;
> - computerized laboratory information system gaming;
> - inter- or intra-professional role playing;
> - standardized patients;
> - task trainers such as rubber arms for phlebotomy;
> - virtual simulation for specimen identification;
> - haptic simulation;
> - high fidelity simulation, or
> - hybrids of any of these examples.
>
> Similar to healthcare simulation, academic student simulation encompasses a range of activities with a broad common purpose of improving the effectiveness and efficiency of services and ultimately, enhancing competency acquisition by students in a safe and secure environment that reduces potential harm to patients, students, and the laboratory and general healthcare systems.

Purpose

This document describes the use of simulation for assessment and evaluation purposes of attaining Medical Laboratory Assistant (MLA) competencies based on the 2024 Pan-Canadian Entry-to-Practice MLA Competency Profile (Profile).

It recommends the maximum use of simulation in evaluation of competency attainment, as related to the MLA competencies found in this Profile, replacing sign-off of MLA competencies and their practice domains in a clinical placement. It also indicates those competencies that must be attained only in clinical placement.

Methodology

This document builds on the previous work done by CSMLS in 2020, through the CSMLS Simulation and Clinical Placement Initiative. In creating the 2020 document, CSMLS used a number of different groups for validation. Now that five (5) years have passed since this initiative, Simulation for Competency Attainment (Simulation) is better understood by both the educational and accreditation communities, and has become part of the CSMLS service offerings to both communities.

This work was and continues to be done in part because of the burden many medical laboratories across Canada face in the midst of an unprecedented Health Human Resource shortage.

The CSMLS MLA Exam Panelists (Panelists) evaluated the Profile for the use of simulation in attaining competency and the CSMLS Board of Directors (BOD) has approved its use in curricula building for MLA educational programs and in the accreditation process for these educational programs.

Results

The Panelists and BOD members practice laboratory medicine in laboratories in various regions across the country adding a national perspective that ensures the integrity of this document's recommendations.

These recommendations are based on a few pivotal points:

1. CSMLS will set a maximum limit for simulation within the evaluation.
   Assessment using simulation can be used in the vast majority of competencies and therefore will not to be defined in this report.
2. CSMLS will not set minimum limits for evaluation using simulation to accommodate needs for programs to create flexible models.
3. CSMLS recognizes that evaluation of competence may require multiple evaluations across time or between scenarios.
   Thus, CSMLS recommends that the maintenance of competence, even when signed off as attained, is clearly written in the documents an educational program uses for competency assessment.
4. CSMLS strongly suggests an educational program create and include a PREAMBLE for the Simulation document that states some competencies have been deemed NOT eligible for simulation assessment, due to the need to mimic actual workflow and volume of specimens in a day to day workplace environment.
   Any competency that has been evaluated as only being allowed to be attained in clinical placement has had an 80% or greater agreement among Panelists.

Practice Domain Breakdown

Recommended Percentage of Simulated Competency Attainment

MLA Competency Category for Entry-Level Practice	Maximum % of Competencies Attained by Simulation
1. Safe Work Practices	≤ 75%
2. Equipment, instruments, and reagents	≤ 100%
3. Pre-analytic Phase	≤ 85%
4. Analytical Phase	≤ 85%
5. Post-analytical phase	≤ 100%
6. Quality and Resource Management	≤ 70%
7. Communication and Collaboration	≤ 75%
8. Professional Practice	≤ 70%

CSMLS Recommendations for Use of Simulation for MLA Competency Attainment

Category 1: Safe Work Practices

Exam Content: 8-12%

Maximum ≤ 75% of curriculum allowed to use simulation for competency attainment (previously ≤ 80%)			Can simulation be used for attainment?
1.1 Maintain a safe work environment	**1.1.1**	Use routine practices and additional precautions.	**NO**
	1.1.2	Apply laboratory hygiene and infection control practices.	Yes
	1.1.3	Use laboratory safety devices safely and effectively.	Yes
	1.1.4	Handle materials according to standard operating procedures and protocols.	Yes
	1.1.5	Practice good ergonomics.	Yes
1.2 Minimize dangers from specimens, supplies and equipment	1.2.1	Use and dispose of sharps safely.	Yes
	1.2.2	Handle biological and other hazardous materials according to legislation.	Yes
	1.2.3	Disinfect and sterilize items using the proper method.	Yes
	1.2.4	Minimize potential hazards associated with disinfection and sterilization methods, use of electrical equipment, and flammable materials.	Yes
	1.2.5	Refuse unsafe work if necessary.	Yes
1.3 Respond to laboratory emergencies, incidents, and accidents according to protocols	1.3.1	Use spill containment and clean-up procedures for biological and other hazardous materials.	Yes
	1.3.2	Implement fire containment or escape procedures.	Yes
	1.3.3	Document and report all safety and personal injury incidents.	Yes
	1.3.4	Maintain safety in potentially dangerous situations.	Yes
	1.3.5	Obtain assistance when warranted.	Yes

Category 2: Equipment, Instruments, and Reagents

Exam Content: 10-15%

*Indicates new to the competency profile

Maximum ≤ 100% of curriculum allowed to use simulation for competency attainment (previously ≤ 100%)			Can simulation be used for attainment?
2.1 Operate standard laboratory equipment	2.1.1	Operate equipment correctly, safely, and according to protocols (includes procedures and manuals).	Yes
	2.1.2	Assess equipment operability.	Yes
	2.1.3	Recognize malfunctions in equipment.	Yes
	2.1.4	Perform preventative maintenance.	Yes
	2.1.5	Maintain instrument and equipment logs.	Yes
2.2 Assess the suitability of reagents	2.2.1	Use/prepare (store/dispose) reagents correctly, safely, and according to protocols.	Yes
	2.2.2	Recognize reagent issues (e.g., out of date, poor quality, incorrect reconstitution, etc.).	Yes
	2.2.3	Maintain reagent preparation logs.	Yes
2.3 Types of Equipment/ Instruments/ Reagents used by MLAs. This is not an exhaustive list but rather a list of the most common.		Needles, vacutainers, tourniquet, etc.	Yes
		Point-of-care testing instruments (e.g., ECG*, Holter*, glucose monitors, etc.)	Yes
		Light measuring systems* (e.g., spectrophotometer and fluorometer, etc.)	Yes
		Microscope - bright field, may include fluorescent, inverted, phase contrast	Yes
		Centrifuge, biosafety cabinet, fume hoods, pipettes, serological pipette controllers, vacuum aspiration systems, autoclaves, micro incinerators/sterilizers, inoculating loops, inoculating needles, anaerobic jars, etc.	Yes
		Reagent preparation equipment (e.g., pH meter, balance, autoclave, glassware)	Yes
		Computer and software	Yes
		Stainer	Yes
		Osmometer*	Yes
		Analyzers, bench-top and floor models	Yes
		Materials for liquid-based cytology (e.g., brush, containers, etc.)	Yes

Category 3: Pre-Analytical Phase

Exam Content: 40-55%

*Indicates new to the competency profile

Maximum ≤ 85% of curriculum allowed to use simulation for competency attainment (previously ≤ 75%)			Can simulation be used for attainment?
3.1 Collect specimen from patient according to protocols	3.1.1	Verify that specimen collection is consistent with requisition.	Yes
	3.1.2	Confirm the identity of the patient.	Yes
	3.1.3	Obtain informed consent prior to initiating procedure.	Yes
	3.1.4	Respect patient's right to refuse collection.	Yes
	3.1.5	Perform venipuncture and capillary blood collection.	Yes
	3.1.6	Obtain samples suitable for laboratory analysis.	Yes
	3.1.7	Adapt approach according to patient response.	Yes
3.2 Handle data accurately	3.2.1	Verify relevant information for test request.	Yes
	3.2.2	Verify that the pertinent data on the specimen and requisition correspond.	Yes
	3.2.3	Verify that specimen identification is traceable throughout sample preparation.	Yes
	3.2.4	Dispose of data according to protocols.	Yes
3.3 Handle specimen according to protocols	3.3.1	Adhere to guidelines for specimen set-up, retention, storage (e.g., refrigerators and freezers), transportation (e.g., dry ice, liquid nitrogen), and disposal.	Yes
	3.3.2	Adhere to established protocols for labeling and traceability of specimens.	Yes
	3.3.3	Verify accuracy of all information (including that the specimen received is consistent with requisition).	Yes
	3.3.4	Handle specimen according to priority and stability.	Yes
	3.3.5	Take responsibility for specimen integrity.	Yes
	3.3.6	Determine course of action if preanalytical errors are detected according to established protocols.	Yes
	3.3.7	Safeguard specimen chain of custody.	Yes

Maximum ≤ 85% of curriculum allowed to use simulation for competency attainment (previously ≤ 75%)			Can simulation be used for attainment?
	3.3.8	Minimize risk of contamination (e.g., disinfection of workspace, cleanup of spills, use of biological safety cabinet, etc.).	Yes
	3.3.9	Accession specimen into laboratory information system.	**NO**
3.4 Prepare specimen (sample) for analysis	3.4.1	Assess specimen (sample) suitability.	Yes
	3.4.2	Monitor specimen (sample) for pre-analytical errors.	Yes
	3.4.3	Select appropriate sample preparation method based on procedures.	Yes
	3.4.4	Prepare specimen (sample) for current and future analysis (e.g., aliquoting, culturing, diluting, extracting/isolating (DNA/RNA)*, quantifying*, etc.).	Yes
	3.4.5	Prepare smears (and/or slides) manually or using automated equipment (for microscopic analysis).	Yes
	3.4.6	Load specimen (sample) on laboratory equipment.	Yes
	3.4.7	Perform staining correctly.	Yes

Category 4: Analytical Phase

Exam Content: 5-10%

*Indicates new to the competency profile

Maximum ≤ 85% of curriculum allowed to use simulation for competency attainment (previously ≤ 75%)		Can simulation be used for attainment?
4.1. Analytical Techniques and Assessments	*The medical laboratory assistant must apply the principles of:*	
	Point-of-care testing techniques for screening (performed on POCT instruments, e.g., blood glucose, heart monitoring*, etc.; simple commercially available screening test kits, e.g., urine chemistry sticks, urine pregnancy, COVID rapid antigen, etc.).	Yes
	Techniques to demonstrate cellular and non-cellular components in tissue and body fluids (e.g., routine staining, ESR, etc.).	Yes
	Verify that microscopic preparations exhibit correct staining. Knowing when to request MLT assistance.	Yes
	Plating or re-plating* MLT identified micro-organisms (according to body site). May include culture media selection, isolation environments, aseptic techniques, etc., as delegated.	Yes

Category 5: Post-Analytical Phase

Exam Content: 3-7%

*Indicates new to the competency profile

Maximum ≤ 100% of curriculum allowed to use simulation for competency attainment (no domain previously)			Can simulation be used for attainment?
5.1 Record result (as delegated) NOTE on issuing blood products: Rare and extenuating circumstances where MLAs may be required to fulfill this role due to severe shortages of MLTs to deliver this service in rural/remote locations, First Nations communities, etc.	5.1.1	Provide record of results (i.e., printout, etc.) to MLT for verification.	Yes
	5.1.2	Record result according to protocols, once result has been validated as acceptable by the MLT, and suited to legal and regulatory requirements (and using the established laboratory information system).	Yes
	5.1.3	Verify accuracy, completeness, and clarity of information (results are released for reporting after an MLT validates the recorded results; this may include, in rare instances, issuing blood product after an MLT has processed, labelled, and released it* to the bank with patient information, following appropriate laboratory protocols).	Yes

Category 6: Quality and Resource Management

Exam Content: 5-10%

Maximum ≤ 70 % of curriculum allowed to use simulation for competency attainment (previously ≤ 75%)			Can simulation be used for attainment?
6.1 Perform internal and external quality control measures (according to requirements)	6.1.1	Make quality a primary objective in all aspects of work so work can be done correctly and efficiently.	Yes
	6.1.2	Document quality control data according to procedures.	Yes
	6.1.3	Use information management systems correctly.	Yes
	6.1.4	Verify the quality of new reagents and media.	Yes
	6.1.5	Respond to deficiencies that may affect the quality of testing.	Yes
	6.1.6	Prepare and run quality control and calibration on equipment/instruments.	Yes
	6.1.7	Assess calibration data for point-of-care equipment/ instruments.	Yes
	6.1.8	Recognize when quality control measures must be implemented, including when equipment requires calibration.	Yes
	6.1.9	Apply continuous quality improvement techniques.	Yes
	6.1.10	Contribute to the revision of procedures, protocols, and reference information.	Yes
	6.1.11	Follow guidelines in filling out incident reports (ensuring timeliness).	Yes
	6.1.12	Participate in quality assurance activities.	Yes
6.2 Apply risk management processes	6.2.1	Address errors and occurrences.	Yes
	6.2.2	Assess the frequency and consequences of errors and occurrences.	Yes
	6.2.3	Reduce risk of potential harm to an acceptable level.	Yes
6.3 Manage health care resources	**6.3.1**	Adapt to change in a dynamic environment.	**NO**
	6.3.2	Manage time, priorities, and work quality.	**NO**
	6.3.3	Maximize efficient use of resources.	**NO**
	6.3.4	Maintain inventory according to organizational requirements.	Yes

Category 7: Communication and Collaboration

Exam Content: 5-10%

Maximum ≤ 75% of curriculum could use simulation for competency attainment (previously ≤ 40%)			**Can simulation be used for attainment?**
7.1 Communicate effectively	7.1.1	Meet language proficiency requirements in English or French (where required).	Yes
	7.1.2	Use format, medium, and techniques suited to purpose and audience.	Yes
	7.1.3	Consider how context affects meaning and messaging.	Yes
	7.1.4	Use precise language and correct grammar.	Yes
	7.1.5	Present information that is accurate, concise, and complete.	Yes
	7.1.6	Adjust speech according to intent of message.	Yes
	7.1.7	Repair communication breakdowns.	Yes
	7.1.8	Work with interpreters as needed.	Yes
	7.1.9	Clarify to enhance understanding.	Yes
	7.1.10	Respond to individual and group stress.	Yes
	7.1.11	Check quality of written text.	Yes
	7.1.12	Maintain and retain accurate records.	Yes
	7.1.13	Use electronic and digital technologies appropriately and responsibly.	Yes
7.2 Interact with patients/clients	**7.2.1**	Apply patient-, family-, and community-centred approaches to care.	**NO**
	7.2.2	Develop professional relationships based on mutual trust, integrity, and respect.	Yes
	7.2.3	Respond to signs of client/patient stress.	Yes
	7.2.4	Show empathy when assisting clients/patients.	Yes
	7.2.5	Provide information on specimen collection, transportation, and storage.	Yes
	7.2.6	Collaborate with people's support networks for best possible outcomes.	Yes
7.3 Collaborate with other laboratory and health professionals	7.3.1	Maintain mutually supportive working relationships.	Yes
	7.3.2	Respect the perspective of others.	Yes
	7.3.3	Consult with members of the health care team when warranted.	Yes

Maximum ≤ 75% of curriculum could use simulation for competency attainment (previously ≤ 40%)			Can simulation be used for attainment?
	7.3.4	Share patient/client information with others as applicable and in line with legislative requirements.	Yes
	7.3.5	Clarify one's role and scope of practice.	Yes
	7.3.6	Manage conflicts.	Yes
7.4 Demonstrate respect for diversity, dignity, values, and beliefs of others	7.4.1	Challenge own assumptions about self or others.	Yes
	7.4.2	Learn about the ideas and opinions of others.	Yes
	7.4.3	Exhibit inclusive behaviour.	Yes
	7.4.4	Practise cultural humility.	Yes
	7.4.5	Use vocabulary that is respectful and inclusive of others.	Yes
	7.4.6	Recognize systems and behaviours that exclude others.	Yes
	7.4.7	Meet employer policies regarding cultural safety, diversity, equity, harassment, and discrimination.	Yes

Category 8: Professional Practice

Exam Content: 4-8%

Maximum ≤ 70% of curriculum allowed to use simulation for competency attainment (previously ≤ 50%)			Can simulation be used for attainment?
8.1 Exhibit professional behaviour	8.1.1	Be accountable for own decisions and actions.	Yes
	8.1.2	Manage own biases, perspectives, and world views.	Yes
	8.1.3	Demonstrate a professional presence.	Yes
	8.1.4	Act in the face of conflicts of interest.	Yes
	8.1.5	Practise in a manner than sustains public trust in the profession.	Yes
	8.1.6	Promote the image and status of the profession as part of the health care team.	Yes
	8.1.7	Maintain personal health and wellbeing.	Yes
	8.1.8	Enhance effective and sustainable practice through self-care and lifestyle strategies.	Yes
8.2 Integrate professional responsibilities into practice	8.2.1	Comply with regulatory requirements if applicable to designation.	Yes
	8.2.2	Follow relevant codes of ethics, codes of conduct, and standards of practice.	Yes
	8.2.3	Maintain privacy, confidentiality, security, and data integrity.	Yes
	8.2.4	Work within scope of practice and area of expertise.	Yes
	8.2.5	Respect professional boundaries.	Yes
	8.2.6	Seek help or decline to act when a matter is beyond own competence or scope.	Yes
	8.2.7	Manage moral and ethical issues that may affect outcomes.	Yes
	8.2.8	Report unprofessional, unethical, unsafe, or oppressive behaviours to the appropriate authorities.	Yes
8.3 Demonstrate a commitment to lifelong learning	8.3.1	Reflect on opportunities for improvement through continual evaluation.	Yes
	8.3.2	Formulate specific, measurable, and realistic learning goals.	Yes
	8.3.3	Implement strategies to achieve learning goals.	Yes
	8.3.4	Integrate new knowledge and skills into practice.	Yes

Maximum ≤ 70% of curriculum allowed to use simulation for competency attainment (previously ≤ 50%)			Can simulation be used for attainment?
	8.3.5	Remain open to learning new skills throughout career.	Yes
	8.3.6	Assist others with their learning.	Yes
8.4 Engage in reflective and evidence-informed practice	8.4.1	Access reliable sources of information.	Yes
	8.4.2	Seek out varied sources of information and feedback.	Yes
	8.4.3	Evaluate information using relevant tools.	Yes
	8.4.4	Use evidence and other knowledge sources to draw conclusions.	Yes
	8.4.5	Evaluate outcomes of decisions.	Yes
8.5 Apply problem-solving strategies	8.5.1	Demonstrate effective trouble-shooting strategies.	Yes
	8.5.2	Develop approaches for managing ambiguities, incomplete information, and uncertainty.	Yes
	8.5.3	Explore complex issues from many points of view.	Yes
	8.5.4	Initiate corrective action as indicated.	Yes
	8.5.5	Initiate follow-up as required.	Yes
	8.5.6	Seek the advice of others as required.	Yes

Clarifications

TERM	CLARIFICATION
adapt	e.g., consider effects of changes in other areas of health care
address	e.g., seek the advice of others, conduct additional inquiries
as indicated	e.g., related to equipment deficiency, specimen integrity
assess	through quality control and calibration
assumptions	i.e., based on culture, orientation, working style, general world view
boundaries	an invisible structure imposed by legal, ethical, and professional standards that respect the rights of the practitioner and others
communication breakdowns	a failure in the exchange of information, often due to the use of ambiguous and confusing messages
common	in the case of the medical laboratory: this should be interpreted as equipment, instruments, reagents, and tests that are used/ordered on a regular basis
conflicts of interest	both real and perceived
course of action	e.g., test cancellation, caregiver notification
cultural humility	a process of self-reflection to understand personal and systemic conditioned biases and to develop and maintain respectful processes and relationships based on mutual trust (FNHA, 2020)
cultural safety	an outcome based on respectful engagement that recognizes and strives to address power imbalances inherent in the health care system; it results in an environment free of racism and discrimination, where people feel safe when receiving health care (FNHA, 2020)
ergonomics	the design and modification of work and the work environment to eliminate discomfort and risk of injury
evidence	e.g., literature review, data analysis, research methodologies/studies, patient information
follow-up	may include reviewing the process and result with a member of the team, conferring with colleagues, delivering result to a supervisor
group stress	the result of poor interpersonal relationships and conflicts
handle	label, date, store, transport, dispose
heart monitoring	e.g., ECG (up to 12 Leads) and Holter POCT
health and wellbeing	including physical, mental, emotional, and spiritual health
inclusive behaviour	as measured by a sense of belonging, connection, and community
information	e.g., spelling of name on labels
information management systems	e.g., computer, laboratory information systems, related technology
integrity	e.g., temperature requirements; centrifuge/serum separation requirements; aseptic technique; cryopreservation
laboratory information system	used for ordering, recording, releasing, and reporting laboratory tests; also known as LIS
maintain/retain	according to standard operating procedures, protocols, regulations, legislation, etc.
manage	identify, develop, correct, seek assistance when required

TERM	CLARIFICATION
manage conflicts	includes resolve, accommodate, communicate about, report if appropriate; keep private and do not discuss publicly
materials	chemicals, dyes, reagents, solutions, including dry ice/liquid nitrogen for transportation of dangerous goods, disposable supplies, and waste
others	e.g., students, new staff, other health care professionals
preanalytical errors	e.g., mislabeled or unlabeled; quantity not sufficient; use of inappropriate container; insufficient or clotted specimen; transport delay; requisition error; storage/temperature; leaking; improper collection
professional presence	behaviour and presentation in accordance with professional standards and expectations, including verbal and non-verbal communication—including on social media—and articulation of a positive role and professional image
quality assurance activities	focuses on "process management": a broader focus than quality control measures - e.g., participate in proficiency testing, audits, accreditation
quality control measures	focuses on "method control": verified examination methods controlled to ensure production of correct results - e.g., verify instrument's internal controls, ensure data points are within acceptable ranges, assess specimen integrity, ensure specimen is correctly identified at all times
quality improvement techniques	e.g., through aligning priorities, analyzing workflows, openly discussing change
relevant	e.g., patient history, specimen source
record (ed, ing)	enter or print result obtained
reporting	using an electronic interface or manual process to disseminate result to ordering health practitioners, once results are validated by an MLT
requirements	e.g., standard operating procedures, quality control measurements, instrument calibration schedules, preventative maintenance schedules, analyte (proficiency) testing, legislation, codes of ethics, rules, regulations
resources	e.g., time, equipment, personnel
respond	i.e., identify, document, report, trouble-shoot, follow standard operating procedures
routine practices	a combination of universal precautions and body substance isolation; routine practices aim to protect against the transmission of all microorganisms through contact with all body fluids, excretions, mucous membranes, non-intact skin, and soiled items in addition to precautions for blood; there are 5 major components to routine practices: risk assessment, hand hygiene, personal protective equipment, environmental controls, and administrative controls
safety devices	e.g., biological safety cabinet, fume hood, laminar flow cabinet, safety pipetting device, safety container and carrier, safety shower, eye wash station, personal protective equipment
standard laboratory equipment	e.g., microscope, centrifuge, biosafety cabinet, various pipettes, autoclave, balance, pH meter, various automated systems, computer, etc.

TERM	CLARIFICATION
strategies	e.g., informal learning opportunities, mentorship, workshops, conferences, webinars, advanced education
suitable	e.g., through the delivery of accurate instructions to patient; collection time/day; use proper containers; obtain sufficient volume
support networks	i.e., family members, substitute decision-makers, powers of attorney, interpreters
techniques	includes using technology to perform a procedure, facilitate communication, etc.
warranted	e.g., for questions about interpretation of results, assurance of quality of a test, discussion of potential sources of error or variables to be considered in test interpretation, determination of need for a specialized test

Profile Revision History

Date	Revisions
2024-FEB-26	Published
2024-JUN-12	Effective date changed Changed Professional Code of Conduct to most recent version Edits to Category 4 Competency Statement and 4.1 "techniques" section for clarity
2024-NOV-26	Removed new competency from 4.1 "or are negative for cellular or non-cellular elements (wet preps)*" and Clinical Chemistry from Area of Practice for this competency.
2025-SEP-23	Category 5, changed from 35% to 100% of curriculum allowed to use simulation for competency attainment